CLAIMS

1. A system for sensing light transmitted with reduced optical aberrations into the interior of an enclosure, comprising:

a window disposed on the exterior surface of the enclosure for allowing light to pass into the enclosure;

a lens disposed on the interior side of said window, defining a cavity between said window and said lens;

a fluid disposed within said cavity, and

an optical sensor disposed in the interior of the enclosure and positioned to receive light through said window and said lens.

2. The system of Claim 1 wherein the exterior surface of said window is formed to a shape other than a flat plate or a spherical dome.

3. The system of Claim 1 wherein the exterior surface of said window is shaped to conform to the exterior surface of said enclosure.

4. The system of Claim 1 wherein the exterior surface of said window is formed to conform to a rotated conic section selected from one of an ellipse, a parabola, or a hyperbola, or is formed as a rotated ogive.

5. The system of Claim 1 wherein said fluid is selected having an index of refraction that minimizes the mismatch with the index of refraction of said window.

6. The system of Claim 1 wherein said fluid has an index of refraction similar to the index of refraction of said window.

7. The system of Claim 1 wherein said fluid is water.

8. The system of Claim 7 wherein the system operates under water.

9. The system of Claim 1 wherein said fluid is a gel.

10. The system of Claim 1 wherein said system operates in a fluid environment and said fluid has an index of refraction similar to the index of refraction of said fluid environment.

11. The system of Claim 10 wherein said fluid environment is selected from one of a bodily fluid, a hydrocarbon, a lubricant, or an industrial chemical.

12. The system of Claim 1 wherein the system is a torpedo.

13. The system of Claim 1 wherein said lens is a corrector element formed to offset optical aberrations caused by said window and said fluid.

14. The system of Claim 1 wherein said lens is comprised of a single optical element.

15. The system of Claim 1 wherein said sensor is gimbal mounted to vary the look angle of said sensor.

16. The system of Claim 1 wherein said lens is formed to correct optical aberrations created by the combination of said window and said fluid, such that light is coupled to said optical sensor in a diffraction limited condition.

17. An underwater system for sensing light transmitted with reduced optical aberrations into the interior of an enclosure, comprising:

a conformal window disposed on the exterior surface of the enclosure for allowing light to pass into the enclosure;

a single element corrector lens disposed on the interior side of said window, defining a cavity between said window and said lens, wherein said cavity is filled with water;

a gimbal mounted optical sensor disposed in the interior of the enclosure and positioned to receive light through said window and said lens through various look angles possible with said gimbal mount, and wherein

said lens is formed to correct optical aberrations created by the combination of said window and said fluid, such that light is coupled to said optical sensor in a diffraction limited condition.

18. A method of implementing a system for transmitting light with reduced optical aberrations to a sensor on the interior of an enclosure, comprising the steps of:

disposing a window on the exterior surface of the enclosure, thereby allowing light to pass into the enclosure;

positioning a lens on the interior side of said window, thereby defining a cavity between said window and said lens;

filling said cavity with a fluid, and

positioning the optical sensor in the interior of the enclosure to receive light through passing through said window and said lens.

19. The method of Claim 18 further comprising the step of forming the exterior surface of said window to a shape other than a flat plate or a spherical dome.

20. The method of Claim 18 further comprising the step of conforming the exterior surface of said window to the shape of the exterior surface of said enclosure.

21. The method of Claim 18 wherein the exterior surface of said window is formed to conform to a rotated conic section selected from one of an ellipse, a parabola, or a hyperbola, or is formed as a rotated ogive.

22. The method of Claim 18 wherein said fluid is selected having an index of refraction that minimizes the mismatch with the index of refraction of said window.

23. The method of Claim 18 wherein said fluid has an index of refraction similar to the index of refraction of said window.

24. The method of Claim 18 wherein said fluid is water.

25. The method of Claim 24 wherein the system operates under water.

26. The method of Claim 18 wherein said fluid is a gel.

27. The method of Claim 18 wherein the system operates in a fluid environment and said fluid has an index of refraction similar to the index of refraction of said fluid environment.

28. The method of Claim 27 wherein said fluid environment is selected from one of a bodily fluid, a hydrocarbon, a lubricant, or an industrial chemical.

29. The method of Claim 18 wherein the system is a torpedo.

30. The method of Claim 18 wherein said lens is a corrector element formed to offset optical aberrations caused by said window and said fluid.

31. The method of Claim 18 wherein said lens is comprised of a single optical element.

32. The method of Claim 18 wherein said positioning step is accomplished with a gimbal mount, thereby varying the look angle of the sensor.

33. The method of Claim 18 wherein said lens is formed to correct optical aberrations created by the combination of said window and said fluid, such that light is coupled to said optical sensor in a diffraction limited condition.